SOCIALIST REPUBLIC OF VIETNAM

Ministry of Health

Ministry of Agriculture
and Rural Development

VIETNAM

INTEGRATED NATIONAL PLAN FOR AVIAN INFLUENZA CONTROL AND HUMAN PANDEMIC INFLUENZA PREPAREDNESS AND RESPONSE

2006 - 2008

A REPORT OF THE SOCIALIST REPUBLIC OF VIETNAM

PREPARED WITH THE SUPPORT OF THE WORLD BANK AND THE UNITED NATIONS COUNTRY TEAM

JANUARY 2006

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1 Background

1.1 Current Status of AI in Vietnam

Vietnam was among the first countries to report cases of Highly Pathogenic Avian Influenza (HPAI) at the start of the current panzootic. After the first confirmed cases in December 2003, the disease was detected throughout the country. At the peak of the epidemic in Vietnam, 24 percent of communes and 60 percent of towns were affected. Up to March 2004, about 17 percent of the poultry population died or were culled.

More scattered outbreaks occurred until November 2004, in which month only one new case was reported in poultry. Then a further wave, continuing until April 2005, affected 670 communes. From April to December 2005, there were 276 infected communes in 28 provinces and approximately 3.7 million culled birds. No new outbreaks in poultry have been reported for over 21 days.

From the very start of the epidemic in December 2003, human cases of AI infection were recorded. Vietnam has reported the highest number of human cases in any country by a significant margin. As of end of December 2005, Vietnam's human toll has been 93 cases, including 42 deaths. Overall, 32 provinces and municipalities have reported human infections, with a concentration around the Red River Delta provinces in the north and the Mekong Delta Region in the south, matching the distribution of poultry outbreaks.

1.2 Economic Impact

It is estimated that the direct impact of the AI epidemic amounted to about 0.12 percent of GDP in 2004. This represents the net effect of the negative impacts on the poultry sector compensated to some extent by the increase in substitute livestock production. The impacts, however, are unevenly distributed as income for poultry and eggs is more important among the poorest part of the population. As the New Year (Tet) approaches, the chances of a new, large outbreak of avian influenza become higher. There are also concerns that the H5N1 virus, which for now is transmitted mainly from bird to bird, and only on a very limited scale from birds to humans, could mutate and be transmitted from humans to humans, raising the prospect of human pandemic. In that event, the economic impact will be multiplied by several orders of magnitude.

1.3 National Strategic Plans

Vietnam completed its *National Preparedness Plan in Response to Avian Influenza Epidemic H5N1 and Human Influenza Pandemic* which was approved by the Prime Minister on November 18, 2005 (Decision No. 6719/VPCP-NN). This integrated plan, prepared by the National Steering Committee for Avian Influenza Prevention and Control, includes the responsive measures under three epidemic phases and scenarios, and allocates responsibilities and actions for fourteen ministries, as well as People's Committees at all levels and mass organizations.

Animal Health Plan. An *Emergency Disease Contingency Plan for Control of Highly Pathogenic Avian Influenza in Vietnam* was approved by the Ministry of Agriculture and Rural Development on

December 5, 2005 (Decision No. 3400 QD/BNN-TY) and constitutes the basis for the national veterinary services to develop their own strategy to control HPAI. This plan includes the establishment of HPAI disease control centers as well as a series of technical guidelines to respond to and control HPAI, to destroy and dispose of affected poultry, to disinfect premises, and to improve disease control activities for poultry traders, transporters, processors and small-scale poultry farms.

Human Health HPAI Preparedness Plan. A *National Plan of Action on Human Influenza Pandemic Prevention and Control in Vietnam* was approved by the Ministry of Health on November 24, 2005 (Decision No. 38/2005/QD-BYT). It addresses all the core areas in HPAI response, including surveillance and early warning systems, risk communication for the public and health care workers, border control and social distancing, and preparing the curative care system. Different responsibilities and interventions are outlined for different phases of an epidemic, under the guiding principle that HPAI preparedness and response should also strengthen the health system's capacity to respond to other zoonoses and emerging infectious diseases in the medium term.

These plans are consistent with the *Global Strategy for the Progressive Control of Highly Pathogenic Avian Influenza* (May 2005) prepared by FAO and OIE in response to the 2nd FAO/OIE Regional Meeting on Avian Influenza Control in Asia held in February 2005 in Ho Chi Minh City and with the *Global Influenza Preparedness Plan* (August 2005) and *Responding to the avian influenza pandemic threat: recommended strategic actions* (September 2005) prepared by WHO.

1.4 Institutional Arrangements, including Coordination Mechanisms

The *National Committee for Avian Influenza Disease Control and Prevention* was established in January 2004 [Decision No 13/2004/QD-TTg, dated 28/1/2004] as the national coordination mechanism for HPAI planning and supervision. It is chaired by the Minister of Agriculture and Rural Development. Ministries of Health, Public Security, Transportation, Trade, Foreign Affairs, Culture and Information, Science and Technology, and Natural Resources and Environment are members. This Committee is meeting on a weekly basis to brief the Government on the evolution of the disease situation and report on the implementation of the control measures. The Prime Minister and Deputy Prime Minister have chaired several of these meetings. The National Committee has also been entrusted with the responsibility for Government – Donor coordination and has met several times over the last six months with the International Community.

More specifically for the human health aspects, a *National Steering Committee for H5N1 Avian Influenza among Human*, chaired by the Minister of Health, evolved from the *National SARS Steering Committee* established in 2003 [Decision No. 297/QDD-TTg, dated March 19, 2003] with participation of other concerned ministries and sectors.

On the donors' side, the EU Presidency, represented by the Royal Netherlands and United Kingdom Embassies in 2005, has assumed a coordinating role. With strong support from WHO and FAO, the EU has organized regular technical meetings as well as briefings for the donor community, NGOs,

and representatives of the private sector. On the request of the Government, donor coordination is now also enhanced by a Joint Government-UN Program (entitled "*Strengthening the Management of Public Health Emergencies in Vietnam – with focus on prevention and control of diseases of epidemic potential including HPAI*") established in September 2005 under the leadership of the National Steering Committee for HPAI to provide assistance for HPAI control and to support the preparation and implementation of the national human epidemic preparedness plan. This program, implemented by FAO, UNICEF, UNDP and WHO, has received financial support from the Governments of Australia, Canada, Finland, Luxembourg, the Netherlands, Sweden, Switzerland and United Kingdom, and is therefore playing a key role in donor coordination.

1.5 Policy Framework

Policy measures adopted by MARD follow the FAO/OIE Global Strategy and propose aggressive control measures for Vietnam through the deployment of the conventional control methods of culling, bio-security and movement control, combined with strategic vaccination of domestic poultry and ducks. Other measures include raising public awareness, strengthening diagnostic capacity, enhancing research capability, imposing a temporary ban on hatching of ducks, and carrying-out an epidemiological surveys to understand the route of transmission as well as the role of wild birds. In addition, for the long term success of the strategy, the restructuring of the poultry industry has to be considered.

Compensation to farmers warrants special attention. Following the recommendation of a study on compensation and related financial support to farmers, the Government support level for compensation for birds culled during the stamping-out of outbreaks has been raised from 10-15 percent of the market value of the poultry slaughtered in 2004 to a level of 50 percent in June 2005 (VND 15,000 per bird), to be equally shared between central and provincial contingency budget. In addition, the Government is considering introducing a "categorized system" for compensation.

The health sector responded to the new threat of HPAI by applying the framework which had successfully controlled SARS. Led by a national committee for SARS and influenza prevention in the centre and, in the provinces, by the departments of health, this aimed at strengthening surveillance and laboratory diagnosis, responding to human cases, planning for key preventive measures such as quarantine, and preparing hospitals for treating influenza patients. The policy framework is addressing these responses in a more sustainable manner, for example by establishing selected health institutes as regional reference centers to support surveillance, preventive measures, and hospital preparedness. The research agenda has been broadened to improve understanding of HPAI as a guide for the sector's response, and greater attention is being given to Information, Education and Communication (IEC) as a means of preventing disease transmission. The response to HPAI is also driving revision of the Ordinance on Infectious Disease Control, which sets the legal framework for reporting by the public and private sector of notifiable diseases, and policy reviews in the context of the need to implement the revised International Health Regulations.

1.6 Major Challenges

Avian influenza presents the animal and human health sectors with new challenges. Its epidemiology, with a long lead time of poultry infection prior to a potentially explosive human epidemic, combined with household economic dependence on backyard poultry raising, make it more complicated than other, emerging infectious diseases, including SARS. Experience of the HPAI epidemic in Vietnam over the past two years have highlighted the following challenges:

Avian influenza control is multi-sectoral in nature. It involves players in health, agriculture, economics, finance, and planning among others, and therefore needs an integrated, multi-sectoral response based on clear, shared objectives. Responses must address the animal health and human health dimensions as well as appropriate social measures. In addition, ensuring involvement of authorities outside of the animal and human health sectors, particularly in the provinces and districts, is needed to address the disease's multi-sectoral nature.

The livelihoods of the rural poor are particularly threatened. The impact of the H5N1 epidemic in Vietnam, where the bulk of poultry raising is still by backyard producers (70 percent of smallholder households produce 60 percent of poultry meat production), has been sharply felt by individual rural households. For poor households depending for their livelihoods on poultry, HPAI has meant the loss of income and food security. Survey data show that in Vietnam the poorest quintile of households relies more than three times as much on poultry income than does the richest quintile, so there are also adverse distributional effects as the smallholders have suffered the most from the epidemic.

Control strategies must include awareness raising and public information and behavior change campaigns. It is extremely important to raise and maintain awareness in the public and private sectors, to address behavior changes in the medium/long term and to strengthen coordination mechanisms for the implementation of the necessary technical responses, involving the Government, the donor community, the private sector, and civil society.

An appropriate balance between short- and long-term actions is needed. There are immediate actions to respond to HPAI which prevent spread amongst poultry and protect humans from exposure, but there are also actions in the long term which minimize the threat of HPAI through control—or eradication—of the disease in birds and rapid detection and response for human cases. Work on the short- and long-term fronts should proceed in parallel and efforts should be made to ensure that short-term responses contribute to proposed longer-term interventions, including building capacity of the systems to respond to other zoonoses.

The response to HPAI needs to build in mechanisms which develop and share new knowledge about the disease. The lack of knowledge about the epidemiology and clinical spectrum of HPAI in animals and humans and of the effectiveness of interventions has been a major constraint in designing a response. It is important to ensure that the response to HPAI incorporates ways of studying the disease (and other emerging zoonoses) and of sharing this knowledge nationally and globally.

Regional collaboration is critical. As presented in the Kunming Initiative for Asian Cooperation on HPAI Control (December 6-7, 2005), attention should be given to support the integration of each country into the regional and global framework for the control of HPAI, and more broadly of all transboundary animal diseases and other emerging infectious diseases, to increase cost-effectiveness and ensure the harmonization of activities and responses.

2 Objectives of the Integrated Action Plan

2.1 Common Objective

The overarching objective of the *Integrated National Plan* (*the Plan*) is to reduce the health risk to humans from avian influenza by controlling avian influenza at source in domestic poultry, by early detecting and responding to human cases, and by preparing for the medical consequences of a human pandemic if it occurs over the next 3 years.[1/]

2.2 Objectives for the Agricultural Sector

For the animal health sector, the overall goal is to progressively control and eradicate HPAI from poultry in Vietnam. The specific short to medium term objectives are:

1. To contain the disease and minimize the occurrence of new outbreaks;
2. To strengthen the capacity of national veterinary services to early detect, diagnose and respond to new outbreaks; and
3. To minimize losses for the poultry sector, especially for poor backyard poultry farmers.

Over the longer term, Vietnam's objective is to restructure its poultry industry by improving bio-security and food safety along the value chain from the producer to the consumer, while protecting the livelihoods of poor farmers and preserving the environment.

2.3 Objectives for the Health Sector

The specific objectives for the health sector's response to HPAI are:

1. To minimize the incidence of, and mortality caused by, avian influenza;
2. To reduce the risk of an influenza pandemic occurring; and
3. To take steps which will reduce the impact of a possible influenza pandemic.

The principle underlying the health sector's response is to link activities targeting HPAI to a broader agenda of strengthening the capacity of the sector to detect, control, and respond to emerging infectious diseases, especially zoonoses. However, *the Plan* is not including the measures to respond to a pandemic in case this scenario happens and consequently the contingency cost associated with this scenario have not been included.

1/ Since it is difficult to predict if and when a pandemic would occur, different scenarios have been prepared with different costs.

2.4 Key performance indicators

Key indicators for achievement of *the Plan* objectives would be monitored during implementation, including:

- Agricultural Sector: (a) progressive decrease in the annual number of outbreaks in domestic poultry with less than 100 communes affected (< 1 percent of total communes number) by the end of December 2008; and (b) progressive reduction in the population of free-range and unvaccinated ducks by 20 percent by the end of December 2008.
- Health Sector: (a) by the end of December 2006, 90 percent of human avian influenza cases are diagnosed and transferred to an appropriately equipped facility within 48 hours of first contact with a medical center; and (b) by the third quarter of 2006, all eight designated tertiary referral hospitals and all Provincial hospitals in 32 most affected Provinces have in place an influenza response plan, which considers triage, diagnosis, isolation, treatment and infection control.
- For both sectors: (a) by the end of the first quarter of 2006, in all human cases, a joint human and animal health field investigation is launched within 24 hours of laboratory confirmation of a human case of avian influenza; and (b) a reduction in the reporting time of new outbreaks and return of the laboratory confirmation to the affected commune from 7 to 10 days to a maximum of 5 days by the end of December 2008, once the laboratory diagnostic capacity has been enhanced.

3 Risks and Threats

The lack of knowledge about HPAI, the short timeframe within which the response has had to start, and the need for strong multi-sectoral coordination make mounting a highly effective HPAI response challenging. Key risks and threats to designing and implementing an effective national HPAI plan include:

3.1 The most effective and efficient interventions may not receive the needed level of funding

Resources can be diverted to less effective interventions because of incomplete knowledge about the best way to respond to HPAI but also because of population demands for funding of high profile areas, such as hospital or laboratory equipment, instead of effective but less visible systems, like surveillance. In addition, uncertainties about the timing, scale and impact of a pandemic mean that resource allocation decisions may not correspond well to actual events in the future, risking either over or under spending in certain areas.

3.2 Limited absorptive capacity means that some investments could be underutilized

Investments, particularly in equipment, may not be fully used because of limited staff number and skills, inadequate funds for maintenance and operation, and shortage of space in facilities. This highlights the importance of carefully reviewing and prioritizing investments based on a realistic

assessment of absorptive capacity of the systems. Similarly, technical assistance and studies should be carefully planned in order not to overwhelm veterinary and medical staff as they are involved in intensive field work, for instance during the vaccination campaign or during the winter season.

3.3 The response does not give sufficient attention to implementation mechanisms in the provinces, districts, and communes

Human resource shortages, insufficient staff skills, and competing incentives make implementation in the provinces, districts, and communes a challenge. Simply having good technical responses to HPAI is unlikely to be adequate unless these implementation questions are also addressed.

3.4 The influenza pandemic starts outside of Vietnam

Although Vietnam's national response may be successful in avoiding human cases and so minimizing the risk of a human epidemic starting in Vietnam, the pandemic influenza virus may come from neighboring countries or further afield. This highlights the need to address border control issues and to strengthen collaboration in the region and internationally.

3.5 Adopting a vertical approach to HPAI will fail to build system capacity to respond to emerging zoonoses in the medium term

By mounting a vertical program approach to HPAI, the response will not develop detection and response capacity for new emerging infectious diseases more generally. This underlines the importance of focusing on sustainable mechanisms in the medium term.

3.6 Certain activities may not be sustainable unless long term financing is addressed.

Sophisticated techniques for laboratory diagnosis of influenza are very expensive, costing US$20-50 per patient. Such costs are currently sustained by ODA. Plans for ongoing financing are required.

4 Description of the Integrated National Plan

The *Integrated National Plan for Avian Influenza Control and Human Pandemic Influenza Preparedness and Response* (*the Plan)* would support activities under the following four components: (a) enhancing coordinated prevention and preparedness capability; (b) strengthening surveillance and early warning systems; (c) strengthening HPAI control and outbreak containment; and (d) building toward a medium-term response.

4.1 Enhancing Coordinated Prevention and Preparedness Capability

National Preparedness. Vietnam has approved plans for the health sector, while the animal health action plan based on the national preparedness plan is in a draft form. However, because of the evolving nature of this type of document, they will have to be updated regularly to reflect changes in scientific knowledge and disease control policy. Financial resources will be needed for these updates, as well as for dissemination and public information.

Policy and Strategy Development. The HPAI epidemic has underlined the importance of linking any intervention to the broader agenda of regulatory and institutional reforms, such as the compensation strategy and the restructuring of the poultry industry. Financial resources will be allocated under *the Plan* to provide MARD with policy advice on restructuring the poultry industry, including studies on potential of relocating farms outside urban areas, on potential of improving bio-security in commercial and village poultry production systems, on feasibility of undertaking restructuring, and on the impact of restructuring on food security for the poor and profitability for commercial farmers. Similar policy advice will be needed for restructuring the poultry slaughtering and marketing systems and updating the Veterinary Ordinance adopted by the National Assembly in April 2004.

Similarly, it is important that health sector interventions to address HPAI are linked to a broader agenda which brings together control measures for a range of communicable diseases into an integrated framework. A related issue is addressing ways to ensure that, under decentralization, the center is able to ensure that provinces respond to its core health concerns, including epidemic preparedness. These are central to the sustainability of improvements in surveillance, response, and information and education campaign (IEC), with potential efficiency gains if applied to a range of infectious diseases, including but not limited to HPAI. Funding under the integrated national plan will support the MOH in reviewing options to address these issues, with a focus on bringing medium-term gains from the investments in the response to HPAI.

Public Awareness, Information, Education and Communication (IEC). Effective public awareness, Information, Education and Communication (IEC) is a critical cross-cutting area, which can have a real and measurable effect on the well-being of the community through what is said, and the speed and sincerity with which it is delivered. There is need for a comprehensive communication strategy for avian flu response and pandemic flu preparedness to ensure that coordinated, effective and focused IEC interventions and clear, correct, creative and consistent key messages relating to HPAI are applied. Through the Joint Government-UN program, an IEC workshop was held in November 2005 with the participation of technical experts from key ministries supporting HPAI control activities to develop an IEC strategy.

The upcoming Lunar New Year (Tet) Festival in late January and early February has been, *inter alia,* identified as a critical time for the potential spread of HPAI. A nation-wide IEC campaign prior to Tet Festival will primarily focus on key messages to prevent transmission from poultry to humans, using the mass media, civil society organizations, and communication officers and health facilities as the main communication vehicles. The MARD, MOH and MOCI will work within the National Steering Committee to coordinate IEC strategies, messages, target audiences, and timing of campaigns.

Program Coordination and Management. The *National Committee for Avian Influenza Disease Control and Prevention* has been established as the national coordination mechanism for HPAI planning and supervision. Central Ministries, primarily MARD and MOH, and Provincial People's Committees have been entrusted with the management of the overall program. Costs associated

with program coordination and management at central and local levels will be financed under the national plan.

The Joint Government-UN Program in its current emergency phase and also in its planned second phase will provide program management and coordination support to the Government, and is a primary channel for international technical assistance. It is also providing a framework for broad international donor coordination and mobilization of donor funds.

Program Monitoring and Evaluation. Evaluation of key interventions and measures will be critical for moving forward. Hence, the national plan would support periodic independent evaluation of both quantitative and qualitative aspects of the program, which will be used to adjust program design on a regular basis.

A sub-committee will be set up under the National Steering Committee for Monitoring and Evaluation. Its functions will be to coordinate the M & E for animal health (by MARD) and for human health (by MOH), produce joint summary reports, and disseminate such reports to the National Steering Committee, other relevant agencies, and international organizations. This sub-committee will also receive support under the Joint Government-UN Program.

Support for Regional Activities. Improved regional coordination and collaboration is critical to ensure the success of the global response to HPAI. Financial resources have been allocated to strengthen collaboration with regional bodies and technical organizations (FAO, OIE and WHO) and to attend regional and international conferences. In particular, Vietnam will join the WHO Global Surveillance Program for Influenza and will cooperate in international and epidemiology and virology studies.

4.2 Strengthening Surveillance and Early Warning Systems

Strengthening Animal Disease Surveillance, Diagnostic Capacity, and Veterinary Research. As part of the prevention and preparedness effort and to enhance the effectiveness of the control strategy, *the Plan* is supporting the following activities: (a) strengthening animal Disease Surveillance and Diagnostic Capacity; (b) enhancing animal diseases information system toward an Early Warning and Detection System; (c) strengthening applied veterinary research. *The Plan* is financing equipment and consumable for the veterinary laboratories network (National Veterinary Diagnostic Center and its six Regional Veterinary Centers, National Institute for Veterinary Research and its two Regional Sub-institutes), information technology and office equipment for the Department of Animal Health (DAH) as well as for the Sub-department at provincial level, training, technical assistance, surveys (mainly routine serological and epidemio-surveillance surveys) and specific studies, mainly epidemiological surveys to inform targeted disease control measures.

Strengthening Human Disease Surveillance, Diagnostic Capacity and Virus Research. Efforts to improve surveillance, already under way, will be expanded at all levels with a key preventive medicine institute in each region assigned technical guidance and supervision responsibilities. The health sector will also establish four BSL3 laboratories across the country, set up mobile laboratory capacity in the regional institutes, and improve the capacity of the Provincial Preventive Medicine Centers to test for respiratory infections, including influenza. Collaboration between animal and

human health will be improved by setting up mechanisms for sharing epidemiological reports and for coordinating work. Research will focus on the epidemiology, virology, and clinical aspects of HPAI and laboratory research will monitor antigenic changes and drug resistance. Vaccine development is planned for the medium term. To achieve these, the program will finance equipment for information systems, laboratories, and rapid response teams, and will train staff and provide technical assistance to support surveillance operation, case investigation and reporting, correct specimen handling, new laboratory procedures, and other needs.

4.3 Strengthening HPAI Control and Outbreak Containment

Targeting Virus Eradication at Source (animals). In order to curb the infection, Vietnam has adopted an aggressive control strategy which include the following activities: (a) destruction of poultry in infected areas (stamping-out) and compensation to farmers; (b) proper disposal of carcasses and potentially infective materials and maintaining disinfection campaigns; (c) strict movement control to prevent the disease from spreading, including the establishment of inter-provincial checkpoints; (d) the temporary ban on hatching of ducks to reduce the population of ducks (in Vietnam there are 60 million ducks, which represent about 30 percent of the total poultry population). These conventional disease control methods are being combined with: (e) a mass vaccination program of poultry linked with post-vaccination surveillance. The vaccination target its to administer three shots per year to 165 million birds, about 75 percent of the total poultry population, and to progressively reduce the scope and target the vaccination to the residual areas of infection. In addition, Vietnam is looking at developing its own vaccine production capacity for poultry; and (f) a program to ensure the safety of all those involved in the vaccination campaign, through the provision of training and protective equipment.

Rapid Containment Operations for Human Infections. A key component of controlling human infections is expanding the early warning and rapid response system. Mobile epidemic task forces are being established in every district and at the provincial level to investigate and manage human cases. These task forces are multi-disciplinary, including epidemiologists, clinicians, and laboratory staff, and will work in collaboration with animal health counterparts. Staff will be trained in case investigation and management and in measures to contain outbreaks during investigations. Equipment for rapid containment efforts will include both diagnostic and infection control materials, such as for specimen collection and disinfectants, and also personal preventive equipment for the teams. In addition, the MOH will develop guidelines to advise the national authorities on health screening at borders, and quarantine and other social distancing measures in the case of an epidemic. Technical assistance will be provided as needed.

Strengthen Health System Capacity to deal with HPAI. The focus of support under the integrated national plan will be the provincial hospitals in the 32 provinces most affected by HPAI and the eight tertiary level hospitals designated as Vietnam's key health facilities for treatment, technical guidance to lower level facilities, and research for HPAI. The hospital network capacity will be further expanded by strengthening resources at 118 provincial and specialized hospitals and then district hospitals and ad hoc field hospitals as funds become available. Individual hospitals have responsibility for planning their own response to HPAI, including establishing influenza

steering committees to oversee patient isolation and infection control, logistics, communications, and establishing a personnel management plan. Stockpiles of essential drugs, including antibiotics, and of equipment for treating critically ill patients will be set up in the eight reference hospitals and at the national level. In addition to medical equipment for patient care, laboratory equipment, and personal protective equipment will be acquired. Health care staff will be trained in case recognition and management and in infection control procedures, and selected staff will receive specialized skills training, such as triage, caring for ventilated patients, and correct handling of the deceased.

4.4 Building toward a Medium-term Response

On a longer term basis, strengthening national veterinary services, improving bio-security in poultry production and trade, upgrading the poultry slaughterhouse system, and ultimately restructuring the poultry industry are important elements of the strategy to guard against the damaging effects of HPAI and other zoonoses. Similarly, strengthening the preventive health system through improved surveillance and rapid response, improved public health laboratory system and through a comprehensive health communication system will be essential elements in building Vietnam's medium-term capacity to respond to emerging infectious diseases. These will be undertaken within an institutional framework which improves collaboration between the animal and human health sectors to address HPAI and other zoonotic diseases. Given the magnitude, both in terms of financial and human resources, of the interventions which need to be carried out over the short term years, *the Plan* does not include any specific costs for these activities; rather, some of the costs have been included under "policy and strategy development" to carry out preparatory studies, as well as under "strengthening surveillance and early warning systems" and "strengthening control and outbreak containment" for capacity building activities.

5 Estimated Budget for the Integrated National Plan

The estimated total cost of *the Plan* for the period 2006-2008 is US$266 million, of which about 52 percent would go for the agricultural sector, mainly to assist the national veterinary services in controlling the HPAI in domestic poultry, and 48 percent for the health sector, to assist the health services in preventing and responding to human cases, and to preparing for a human influenza pandemic (see Table 1 below).

These costs do not include the cost of restructuring the poultry industry or other medium term activities to respond to a global threat of human influenza pandemic. Moreover, for the health sector, these costs include investment in "preventive" (surveillance, early warning and rapid response), IEC and "curative" care areas, but costs for responding to the human pandemic scenario are not been included.[2/]

2/ If all provinces were to receive curative care investment and emergency support in the event of a pandemic, the total amount for the health sector would increase from the current US$128 million to US$163 million (see "preparing for the medical consequences" under the Section 21. "Common Objective").

Table 1: Estimated budget by component

	Agricultural Sector (US$ '000)	Health Sector (US$ '000)	TOTAL (US$ '000)
I. Enhancing Coordinated Prevention and Preparedness Capability			
I. A. National preparedness	160	160	320
I. B. Policy and strategy development	500	500	1,000
I. C. Public awareness and information, education and communication	2,000	2,900	4,900
I. D. Program coordination and management	24,400	2,470	26,910
I. E. Program monitoring and evaluation	740	650	1,350
I. F. Support for regional activities	600	420	1,020
Sub-total	28,400	7,100	35,500
II. Strengthening Surveillance and Early Warning System			
II. A. Strengthening animal disease surveillance, diagnostic capacity and veterinary research	7,900		7,900
II. B. Strengthen human disease surveillance and diagnostic capacity [1/]		53,600	53,600
Sub-total	7,900	53,600	61,500
III. Strengthening HPAI Control and Outbreak Containment			
III. A. Targeting virus eradication at source (animals) [2/]	101,200		101,200
III. B. Rapid containment operations for human infections		14,900	14,900
III. C. Strengthen health system capacity to deal with HPAI [3/]		52,900	52,900
Sub-Total	101,200	67,800	169,000
Total	137,500	128,500	266,000
1/ Excluding BSL3 Laboratories to be co-financed by JICA			
2/ Including US$ 15 million for compensation to farmers			
3/ Excluding US$ 21.15 million for anti-viral stockpiling			

The breakdown by category presented in Table 2 below shows relatively high incremental operating costs (over 16 percent overall, of which approximately 93 percent for animal health sector). Measures to control HPAI in poultry, including vaccination campaigns, stamping-out and disinfection measures, control of movements of birds and poultry products, and increased animal and human disease surveillance, are labor intensive. Hence the need for the international community to support these costs as well, which are going to last several years and are key to the success of the overall strategy to control HPAI. Other categories include goods (approximately 65 percent), consultant services and training (approximately 9 percent), and public awareness, information, education and communication (less than 2 percent). Civil works account for only a small proportion of the total budget.

Table 2: Estimated budget by category

	Agricultural Sector (US$ '000)	Health Sector (US$ '000)	TOTAL (US$ '000)	(%)
A. Works	5,000	2,000	7,000	2.6
B. Goods	66,500	105,500	172,000	64.7
C. Consultant Services	6,200	9,000	15,200	5.7
D. Training	2,500	6,000	8,500	3.2
F. Public Awareness, Information, Education & Communication	2,000	2,900	4,900	1.8
E. Compensation	15,000		15,000	5.6
F. Incremental Operating Costs	40,300	3,100	43,400	16.3
Total	137,500	128,500	266,000	100.0

6 Financing Plan for the Integrated National Plan

The Government of Vietnam is aware of its responsibilities to protect its people but also to reduce the risk of a human influenza pandemic by controlling the disease at source in domestic poultry. Vietnam has embarked on a much more determined fight against avian influenza. Enhancing coordinated prevention and preparedness capability, strengthening surveillance and early warning systems, setting up a massive vaccination campaign, and scaling up the amount of compensation provided entails substantial costs to society. The Government is committed to finance up to 50 percent of this cost (see Table 3), and approximately US$104 million have already been allocated from the state budget for the next two years.

From a global perspective, Vietnam is also providing a public good. Thus, the response of the international community has been substantial. WHO, OIE and FAO each sent teams and experts as early as January 2004 to assist the Government in containing the outbreak, and several bilateral assistance agencies, NGOs and private sector companies donated protective clothing, disinfectants and other goods and services. FAO approved regional and country-focused TCPs to provide technical assistance with disease diagnosis and epidemiological surveillance. The World Bank has been very responsive in preparing an Emergency Recovery Loan to support the "*Avian Influenza Emergency Recovery Project*" which was approved in August 2004 and received a co-financing grant from the Government of Japan. DANIDA, which has a long term presence in livestock development, has supported MARD since March 2004 to control HPAI outbreaks. Similarly ADB, AusAID, the European Commission, and the French, German and Japanese Governments have allocated funds to support either MARD or MOH. Finally, as mentioned above, a Joint Government-United Nations Program "Strengthening the Management of Public Health Emergencies in Vietnam" was established in September 2005. The overall amount committed so far by the international community is approximately US$ 46 million (see Annex 2), part of which has been spent over the period 2004 and 2005.

The estimated financing gap is 34 percent (equivalent to approximately US$ 91 million) for which Vietnam is soliciting international support through grants and loans. These are preliminary estimates which will need to be refined and fully appraised following the outcomes and recommendations of the International Pledging Conference on Avian and Human Pandemic Influenza in Beijing.

Table 3: Proposed financing plan

	Agricultural Sector (US$ '000)	Health Sector (US$ '000)	TOTAL (US$ '000)	(%)
A. Government of Vietnam	70,000	65,000	135,000	50.8
B. Joint United Nations Program	5,600	2,100	7,700	2.9
C. World Bank (IDA Credit)	5,000	13,000	18,000	6.8
D. Other Multilaterals and Bilaterals	10,200	4,000	14,200	5.3
F. Financing Gap	46,700	44,400	91,100	34.2
Total	137,500	128,500	266,000	100.0

Annex 1

PRELIMINARY RESULTS AND CHALLENGES OF THE VACCINATION CAMPAIGN IN VIETNAM

Introduction

Disease caused by highly pathogenic H5N1 avian influenza viruses was first diagnosed in Viet Nam in late 2003. This was the start of the first of three distinct waves of disease. The first two waves (winter 2003/2004 and winter 2004/2005) were controlled using "traditional" measures including stamping out, disinfection and movement controls.

Although the use of these measures reduced the impact of the disease, they extracted a very high economic cost through destruction of poultry and lost production. In addition, these measures did not prevent new cases of disease in poultry and humans. Twenty-nine human clinical cases were diagnosed in 2004 (20 fatal) and 61 clinical cases were confirmed in 2005 (19 fatal).

When poultry were introduced to previously infected, depopulated areas there was a high probability that these would get re-infected through introduction of virus from surrounding infected areas. Other control measures were therefore needed to overcome these problems.

By the time the third wave commenced in late 2005, vaccination had been added as an additional control measure. This Annex reviews the factors that were considered by the Government of Viet Nam (GoV) in deciding to implement vaccination, the logistic aspects of the vaccination campaign, results of the vaccination campaign and post-vaccination surveillance obtained so far and the future direction for the use of vaccination.

Why was vaccination introduced?

A formal decision to use vaccination as an additional control measure was made in August 2005.

Experience from other places, notably Hong Kong SAR and Mainland China, showed that vaccine is a legitimate tool to assist in controlling H5N1 highly pathogenic avian influenza. This was also reflected in FAO's recommendations on control, which clearly stated that vaccination is one of the methods that should be considered for control of this disease.

The four main reasons for introduction of vaccination to Viet Nam were:

- **The high likelihood of recurrence of infection**. The first two waves of avian influenza commenced during late autumn and winter, a pattern that has been seen in other countries in the region. It was considered likely that a third wave of infection would occur as the weather turned cooler in late 2005, and in fact this did occur.
- **The role of domestic ducks in carriage of avian influenza viruses**. Domestic ducks are now well recognized as short-term carriers of H5N1 AI viruses. Viet Nam has a standing population of some 60 million ducks that support the livelihood of many people, especially in

the Mekong and Red River deltas. Infection in ducks can occur silently and therefore it is not possible to detect all cases of infection on the basis of clinical signs. Serological surveillance revealed that a significant number of flocks of ducks had been exposed to H5 virus but it was not feasible to test all flocks for evidence of exposure and active infection. Most ducks are reared outdoors in non-biosecure facilities and vaccination was seen as one way of reducing this risk.

- **Difficulties in controlling disease at the smallholder and village level**. Most rural households in Viet Nam raise some poultry and are outside the formal market sector. If disease occurs in this sector there is often a reluctance to report this to authorities and in some cases the disease is not recognized as avian influenza. Many cases of this disease occur in a form that is not distinguishable from other common diseases such as Newcastle Disease. Disease at the smallholder level was also controlled by culling of known infected flocks but this did not prevent emergence of new cases in humans.
- **Continuing cases of human infection and disease.** The world is concerned about the possibility of emergence of a strain of influenza capable of transmitting directly from human to human. The risk of this occurring increases with the number of human exposures. GoV considered it extremely important to reduce the amount of circulating virus and therefore the likelihood of exposure of people to these viruses. As properly vaccinated immune poultry are less susceptible to infection and excrete less virus when infected, the use of vaccination was seen as a valuable tool for reducing human (and poultry) exposure.

What to vaccinate and when?

Given the very large number of poultry reared in the informal smallholder and village sector and the concentration of human cases in these sectors it was considered essential for the vaccine campaign to include the millions of households rearing small numbers of poultry. This created some major logistical difficulties. In many provinces, door-to-door vaccination or the establishment of vaccination points in villages or communes was required.

Ducks were seen as an extremely important target for this campaign given their role as silent carriers of virus. Information on the response of ducks to vaccines is scant but by the time the campaign commenced the available experimental evidence indicated that vaccinated ducks should be protected from infection and disease.

As it was not feasible to vaccinate all poultry at the recommended age it was decided that two rounds of vaccination one month apart would be conducted. All vaccinated chickens will be revaccinated after six months and, based on experimental studies on duration of immunity, all ducks will be revaccinated after four months.

In the future, moves will be made to vaccinate commercial poultry at the recommended age. In addition all replacement chicks from commercial hatcheries will be vaccinated at day old with a pox vectored avian influenza vaccine. Similar strategies are being developed for replacement ducks.

Vaccination logistics

The decision to implement vaccination was only made in the second half of 2005 leaving limited time available to ensure a high level of protection in the nation's poultry before the winter of 2005-06. Viet Nam has 64 provinces and it was estimated that there were some 167 million poultry eligible for vaccination. This meant that each province had to mobilize sufficient resources to vaccinate, on average, over 2 million poultry, twice in a very short time frame.

To assess the logistic difficulties, two trial provinces were chosen (Tien Giang in the south and Nam Dinh in the north) in which the vaccine was introduced before the program was extended to other provinces. The experiences from these provinces were used to fine tune the program in the other provinces. Training of vaccinators (or trainers of vaccinators) was conducted and relevant supplies were delivered to all provinces. Some logistic problems were experienced especially in the areas of vaccine supply, vaccine gun breakdowns and payment rates for vaccinators. These problems were overcome as they arose but did lead to some delays in completion of the second round.

A campaign of this nature will only succeed if it has strong support from the highest levels down to the commune and village level. Considerable effort was expended to ensure that this program was supported and endorsed from the level of the Prime Minister and the importance of this campaign was reflected down through the provincial structure. Funding for the program was obtained from the central government with an initial central allocation of US$19.1 million for the first phase in 2005 and 2006.

Source of vaccines

Four vaccines have been utilised in the vaccine campaign so far.

- The two main vaccines used are derived from China. Both are killed, oil-adjuvanted vaccines produced by the Veterinary Research Institute Harbin, China. Vaccines used in chickens contain an H5N2 antigen. This particular strain grows to high titre in eggs but is a distant genetic match to currently circulating H5N1 strains. The use of this particular antigen gave the option of using a DIVA strategy (a strategy to distinguish infected from vaccinated birds) in chickens as the campaign moved towards eradication. The vaccine used for waterfowl contained an H5N1 antigen produced by reverse genetics incorporating genes from a virus isolated from a goose in China in 1996 and closely related to currently circulating strains of virus. This particular antigen had been shown in experimental trials to produce a better immune response in ducks than the H5N2 antigen.
- A third, fowl pox-vectored vaccine is being used in hatcheries for replacement chicks.
- A small quantity of Nobilis (Intervet) vaccine containing an H5N2 antigen was used by large commercial breeders.

All vaccines were tested experimentally at the National Veterinary Research Institute before being used in the field.

Success of vaccination

The first two rounds of vaccination have now been completed. In total some 244.4 million doses of vaccine have been administered – with 166.3 million doses administered to chickens and 78.1 million doses administered to ducks.

So far, no outbreaks of disease have been detected in fully vaccinated poultry and no new cases have been seen in poultry or humans since the two rounds of vaccination were completed. The third wave of cases was curtailed and it is pertinent to note that all cases of disease in this wave occurred in poultry that were deemed ineligible for vaccination (e.g. short lived broilers). It would be simplistic to attribute all of these improvements to vaccination alone as other measures were also introduced, including closure of live bird markets and bans on hatching of ducks, and the demand for poultry has fallen reducing poultry numbers. Nevertheless, it is likely that vaccination has played a significant role in this reduction in the number of reported cases of disease.

Post-vaccination surveillance

Post-vaccination surveillance is needed to assess whether vaccinated poultry are producing adequate levels of antibody, to detect cases of silent shedding of virus and to monitor viruses for any antigenic changes that may arise as a result of vaccination.

Until recently, the main focus of veterinary authorities has been implementation of vaccination and therefore post-vaccination surveillance is only now being undertaken. Preliminary results suggest that the majority of tested vaccinated flocks have developed reasonable levels of immunity but that the response in a few flocks was sub-optimal. Flocks with sub-optimal immune responses are being investigated to allow introduction of appropriate changes to the vaccination program. For example, in some of these flocks it is likely that inexperienced vaccinators were a factor in the poor response. This can be overcome through enhanced training of vaccinators before the next round.

Work is also continuing, especially in ducks, to establish whether vaccinated flocks are silently excreting virus. Sentinel poultry have been placed in a few selected flocks to assist in detecting silent virus excretion. At this stage it is not possible to have these in all vaccinated flocks due to the limited capacity of veterinary services to monitor these. However, as the control program moves from the current phase to an eradication phase in certain compartments then sentinels or other DIVA strategies to detect silent infection in flocks should be used in all vaccinated flocks. This has considerable resource implications that will need to be addressed.

Road map for the future

The current vaccination program is seen as the first phase in a long-term program to control and eventually eliminate H5N1 HPAI from Viet Nam. Vaccination is being used at present to dampen

down the levels of infection, providing an opportunity to implement some of the structural changes needed to assist in control. It needs to be recognized that some of these structural changes, especially at the smallholder and village level, require major social adjustments and must be implemented in a coordinated manner that does not disadvantage the rural poor.

Vaccination will be required for some years to come as an aid in controlling avian influenza in Viet Nam, but the intensive blanket program, as currently practised, cannot be sustained for very long. Movement to targeted vaccination in the next and subsequent phases of control will depend on availability of appropriate intelligence on the effectiveness of the current control program and development of a clear "road map" showing how to progress from one phase to the next.

Annex 2

DONOR SUPPORT TO HPAI CONTROL IN VIETNAM

Donors	Amount (US$ equivalent)	Activities
I. Grants from donor community for Avian Influenza Control		
Government of China	125,110	2004, Protective equipment and disinfectants
Government of Korea	30,000	2004
Government of Denmark	1,500,000	Support from ASPS Program
Government of United Kingdom (DFID)	1,461,978	Equipment and disinfectants
Government of New Zealand	250,000	2005 - Equipment and disinfectants
Government of New Zealand	136,000	Provincial level activities (thru CARE International)
Government of Germany (GTZ)	60,000	Equipments
Government of Germany	4,500,000	Equipment support for EWARS (thru WHO)
Government of the Netherlands	18,510	2004/05 - Upgrading health care isolation facilities (thru WHO)
Government of Australia (AusAID)	15,900	2004 - Equipment (thru WHO)
Government of Japan	401,750	OSRO/RAS/401/JPN (thru FAO)
Government of Japan	1,774,000	JSDF Grant (thru World Bank-funded AIERP)
Government of Japan (JICA)	4,000,000	MOH - BSL3 Laboratory
Government of the Luxembourg	60,990	2004/05 - Enhanced influenza surveillance (thru WHO)
Government of France	100,000	2004 - Technical Assistance (MARD)
Government of France	620,000	Support to *Institut Pasteur (MOH)*
Government of Italy	122,549	2004/05 - IEC, Research (WHO)
Government of the United States of America	2,634,000	Education, training and equipment
USAID Grant through AED	1,000,000	Public communication activities (IEC)
Sub-total	**17,810,787**	
II. Grants from multilateral and international organizations for Avian Influenza Control		
ADB	50,000	Protective clothes
ADB	15,000	2004 - PPE and disinfection equipment (thru WHO)
EC	945,274	2204 - Equipment (thru WHO)
EC	969,363	Training, equipment and antival drugs (thru WHO)
FAO	387,979	TCP/VIE 3003
WHO	25,000	Sprayers, multi-protective clothes
Sub-total	**2,392,616**	
III. Grants supported through the joint UNDP program (UNDP/FAO/WHO/UNICEF signed October 13, 2005)		
Finland	3,209,384	
Netherlands	1,175,000	
Australia	750,000	
Switzerlands	399,980	
Canada	854,701	
Luxembourg	605,327	
DFID (UK)	119,927	
UNDP	70,000	
Sweden	510,856	
Sub-total	**7,695,175**	
IV. Others		
World Bank - Avian Influenza Emergency Recovery Project	5,000,000	Signed August 27, 2004 (Cr. 3969-VN)
World Bank - National Health Support Project	13,000,000	Reallocation of funds (Cr. 2808 - VN)
Sub-total	**18,000,000**	
TOTAL[1/]	**45,898,578**	

Source: Ministry of Agriculture and Rural Development, Ministry of Health and UNDP (as of December 31, 2005)

1/ Non Governmental Organizations as well as private companies have also provided support to the Government of Vietnam which is not included in this table.